



Project Number

BDX86

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Method to Predict Seasonal High Ground Water Table (SHGWT)

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Current Situation

To help assure stability and long-term performance of pavement, a roadway's base layer must remain dry and be higher than the seasonal high groundwater table (SHGWT). Otherwise, the roadway's foundation can be weakened during certain times of the year, leading to rutting and other roadway damage. SHGWT is defined differently across Florida's five water management districts and seven Florida Department of Transportation (FDOT) districts. Differences occur in part because of variations in landscape, geology, and hydrology across the state, creating some confusion about how best to estimate SHGWT.

Research Objectives

In this project, the researcher identified and evaluated the methods used to determine SHGWT throughout Florida and made recommendations for procedures that would result in more consistency and accuracy in determining SHGWT.



This rut indicates a failure in the base beneath the road, perhaps affected by the water table.

Project Activities

The researcher thoroughly investigated the definitions and procedures that a wide variety of agencies use to determine SHGWT. For example, in response to a questionnaire, the FDOT districts reported use of the following methods: Districts 2 and 5 – correlation to historical water levels; and Districts 1, 4, and 6 – vegetative and soil indicators. The same questionnaire provided information from the districts on landscape types, hydrogeological features, special challenges to determining SHGWT, and common geotechnical methods.

The researcher evaluated numerous potential sites at which field tests, measurements, and observations could be performed and used with several methods of estimating SHGWT. Test sites were located in 14 Florida counties and in seven FDOT districts. Information about the test sites was collected during the selection process, with additional field characterization of the test sites. Testing performed at each site included standard penetration test (SPT), soil color description, soil horizon designation, redox features, hydraulic conductivity analyses, and others. Data were collected between January 2015 and October 2016.

SHGWT was estimated for each site using several methods over the collection period. Site-specific issues affected use of some methods for some sites. Field measurements of SHGWT were compared to estimates that have been commonly used. In many cases, the field values and the estimated results did not match, further confirming the need for improved methods. The researcher noted the conditions that affected the magnitude of these errors (between estimated and measured values) and attempted to resolve problems in an effort to improve results.

Based on this comprehensive study, a set of procedural recommendations was developed to help guide design engineers through the process of applying methods and techniques for determining SHGWT conditions within the seven FDOT districts.

Project Benefits

Improved methods of determining water tables will help assure more durable and efficient roadway designs, thereby ensuring the long-term performance of the pavement in a cost-effective manner.

For more information, please see www.fdot.gov/research/.